ORIGINAL RESEARCH

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The Obstetrics Outcomes of Vaginal Birth After Cesarean Section in a Cohort with High Induction of Labor Rate

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ABSTRACT Objective: Our primary objective is to evaluate the short-term maternal and perinatal results associated with the mode of delivery after cesarean section (CS). A second objective is to investigate the factors governing the success of trial of labor after cesarean (TOLAC). **Material and Methods:** In this retrospective cohort study, 126 singleton cephalic deliveries of women who had a history of one CS delivery were analyzed. The patients were divided into two groups: those who underwent TOLAC (n=31) and those who underwent elective repeat cesarean section (n=95). Delivery data, demographics, obstetric and medical history, intrapartum events, and maternal and perinatal outcomes were assessed. **Results:** The rate of successful vaginal birth after cesarean among the women who chose TOLAC was 64.5%. The groups were similar to each other with regard to maternal and perinatal complications. According to the current pregnancy characteristics of the patients with successful and failed vaginal delivery attempts; there were statistically significant differences between the groups in terms of Bishop scores and birth weights. The Bishop scores were higher in the successful TOLAC group (3.5 vs. 1; p=0.001). However, the birth weights were lower in the successful TOLAC group (3393±395 vs. 3708±430; p=0.049). The rate of spontaneous labor was higher in the successful TOLAC group, although it did not reach statistical significance. **Conclusion:** TOLAC is a farily safe procedure for selected pregnant women with one previous cesarean sections. It should be offered to all suitable pregnant women in order to reduce high CS rate and prevent complication associated with higher order repeat cesarean.

Keywords: Cesarean section; complication; labor, induced; trial of labor; vaginal birth after cesarean

In recent decades, cesarean section (CS) rates have increased in both developed and developing countries. The World Health Organization (WHO) recommends 10-15% as suitable CS rates; however, the rate in Turkey is 52%.[1,2] This rise may be attributed to the several changes in the practice environment, including the decreased proportion of operative vaginal deliveries and increased use of electronic fetal monitoring. Likewise, malpractice fears, patient preferences, and demographic factors have influenced this increase in CS rates.[3] Furthermore, the belief that "once cesarean, always a cesarean" is related to high rates of planned repeat CS.[4] This misconception can cause adverse maternal outcomes and complications in future pregnancies, such as hemorrhages, infections, visceral organ injuries, transfusions, and need for hysterectomies because of abnormal placentation.[5]

An attempt at a vaginal birth in a woman who has had a CS is defined as trial of labor after cesarean (TOLAC). It may result in a successful vaginal birth after cesarean (VBAC) or an elective repeat CS (ERCS). Almost half of ERCS deliveries are performed because of a history of CS birth. VBAC is associated with several positive effects on women's health, such as low maternal morbidity, short

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postpartum recovery time, and decreased risk of future pregnancy complications; it is also more cost-effective compared with ERCS.[6,7] However, patients should be informed about the potential risks of a failed TOLAC, which is associated with more than a threefold increase in maternal morbidity compared with ERCS.[8]

In the US, 10-14% of women prefer TOLAC; this ratio is considerably lower in Turkey.[9,10] The delivery mode is strongly related to antenatal counselling and clinical assesment. Patients should consult about the potential risks and benefits of both TOLAC and ERCS deliveries. The second biggest concern about TOLAC is uterine rupture, although the absolute risk of uterine rupture with labor after CS is < 1%.[11] In appropriate patient groups, TOLAC is a safe alternative to ERCS for women attempting a vaginal birth after a CS.[12,13] The success rate in the majority of published series of TOLAC is reported between 60% and 80%.[14] Many factors that impact VBAC success have been identified. Furthermore, some studies aimed to propose antenatal scoring systems to predict the success of a planned vaginal delivery following a CS, but none of them had a patient cohort large enough to validate such scoring schemes for use in clinical practice.[15,16]

With this background, the primary objective of the present study is to evaluate the short-term maternal and perinatal outcomes associated with the mode of delivery after CS. A second objective is to investigate the factors predicting the success of TOLAC.

MATERIAL AND METHODS

This retrospective cohort study was conducted in the Department of Obstetrics and Gynecology at Bezmialem University Hospital between May 2019 and February 2020. It was based on an analysis of 126 singleton cephalic deliveries of women who had a history of one CS delivery. The study protocol was approved by the local institutional ethics committee (Ethics committee of Bezmialem Vakıf University, no:6/22, 10/06/2020) and was carried out in accordance with the principles set forth in the Helsinki Declaration 2008.

The patients were divided into two groups: those who underwent TOLAC (n=31) and those who underwent ERCS (n=95). The inclusion criteria were as follows: maternal age between 18-45 years, one previous CS with a lower uterine segment transverse incision after 32nd gestational weeks, morphologically normal fetus, previous-birth-to-pregnancy interval of at least 18 months, estimated fetal weight less than 4250 g, and vertex presentation. Potential participants were excluded for any of the following reasons: previous classic incision, previous uterine rupture or uterine surgery, multiple pregnancies, non-cephalic presentation, estimated birth weight greater than 4250 g, and high-risk pregnancies (IUGR, nonviable fetus at labor, severe placental abnormalities). Patients meeting the inclusion criteria requested vaginal birth while under outpatient clinic control at the 35th gestational week. The potential risks and benefits of both TOLAC and ERCS were discussed, and written informed consent was obtained.

The patients in TOLAC group were expected to go into spontaneous labor until the 41st week of gestation. Patients who did not undergo spontaneous labor were hospitalized, and their Bishop scores were assessed. According to their Bishop scores, the following methods were performed: oxytocin augmentation/induction, digital cervical ripening, Foley catheter application (60-80 cc), or amniotomy (artificial rupture of membranes). The maximum oxytocin dose used for labor augmentation or induction if necessary was 16 mU/min. Prostoglandine analogues were never used for these patiens. Continuous electronic fetal monitoring was conducted in all cases. Epidural analgesia was not preferred. Delivery data, demographics, obstetric and medical history, intrapartum events, maternal and perinatal outcomes, were retrieved from hospital records.

The descriptive statistics of the groups were expressed as percentages and rates. The distribution of variables within the groups was evaluated by the Kolmogorov–Smirnov test and by means of histograms. While variables with normal distributions were compared with Student's t-test and, variables showing abnormal distributions were compared with Mann-Whitney U test. Nominal variables were compared with chi-square test. Binary logistic regression analysis could not be performed because the study group was not large enough. The statistical signifi-

cance level was set as p<0.05. All statistical analyses were performed with the software SPSS (version 23, Chicago, IL, USA).

RESULTS

We collected data of 126 pregnant women who underwent TOLAC or ERCS. A total of 31 cases chose TOLAC, and 95 underwent ERCS. The rate of successful VBAC among the women who chose TOLAC was 64.5% (n=20).

The groups were similar with regard to patient age, gravida, parity, abortion, gestational age at birth, maternal body mass index (BMI) at delivery, female fetal gender, Apgar score, and umbilical cord pH. The previous-birth-to-pregnancy interval was significantly longer in the TOLAC group compared with that in the ERCS group (56.5±22 weeks vs. 40.8±19.5 weeks, respectively; p = 0.001). During admission to the delivery room, the TOLAC group had higher Bishop scores than the ERCS group (3 (1-7) vs. 1.5 (1-2), respectively; p<0.001) and had higher spontaneous membrane rupture rates (4 (9.7%) vs. 1 (%3.4), respectively; p<0.001). There were statistically significant differences between the TOLAC and ERCS groups in birth weight (3505±429 g vs. 3182±399 g, respectively; p=0.001). There were no maternal or neonatal deaths in either group. However, maternal complications occured in 4 patients (4.3%) from the ERCS group. Three patients developed wound infections that were treated with antibiotics. Uterine atony was reported in one patient, but there was no need for a peripartum hysterectomy. Uterine dehiscence occurred in one patient in each group. A diagnosis of uterine dehiscence was made upon the detection of arrest of labor and loss of station of the fetal head in the birth canal in the TOLAC group, while the same diagnosis was made incidentally during elective surgery in the ERCS group. Perinatal complications, namely, admission to the neonatal intensive care unit (NICU), respiratory problems, neonatal sepsis, and birth trauma, did not differ significantly between the TOLAC and ERCS groups (p=0.291). One patient (3.2%) in the TOLAC group was admitted to the NICU because of fetal acidosis and stayed in neonatal unit for 4 days. This baby showed normal motor and mental development at a regular follow-up pediatric visit. In the ERCS group, 10 neonates (10.5%) required NICU admission (7 transient tachycardia, 2 hypoglycemia, 1 neonatal conjunctivitis) (Table 1).

Table 2 shows the obstetric features of the TOLAC patients. The most common reason for opting for CS in their previous pregnancies was “failure to progress”. Eight patients (25.8%) had vaginal deliveries before the index pregnancy. Labor induction was performed with Foley catheters in five patients (16.1%) and intravenous infusion of oxytocin in four patients (12.9%); Concomitant oxytocin infusion and Foley catheters were administrated to 15 patients (48.3%) for increasing the efficacy induction of labor. Oxytocin augmentation was needed in 20 patients (64.5%). “Failure to progress” in the current pregnancy was the most common CS indication for the failed trials in the labor group. Two patients underwent emergency CS after amniotomies. Cord prolapse occured in one of the patients, whereas the presenting part of the fetus changed in the other patient.

The current pregnancy characteristics of the patients with successful and failed vaginal delivery attempts are shown in Table 3. There were statistically significant differences between the groups in terms of Bishop scores and birth weights. The Bishop scores were higher in the successful TOLAC group (3.5 (1-7) vs. 1 (1-4); p=0.001). However, the birth weights were lower in the successful TOLAC group (3393±395 vs. 3708±430; p=0.049). The rate of spontaneous labor was higher in the successful TOLAC group, although it did not reach statistical significance.

DISCUSSION

The success rate of TOLAC is reported to be between 60% and 80% in the international literature.[14] In local data, this rate is between 55% and 84%.[17-21] The largest study published from Turkey was conducted in a tertiary hospital with 195 women and yielded a 72.3% success rate.[21] Akcay et al. reported the highest TOLAC success rate in Turkey, namely, 84.2%. This high success rates may associated with 36 of the 38 patients who were admitted with spontaneous

TABLE 1: Comparison of TOLAC and ERCS groups in terms of primary demographic, clinical characteristics and obstetric results.

Characteristics	TOLAC (n=31)	ERCS (n=95)	p
Age (years)	31.29±5.2	32.08±5.08	0.455
Gravida	2 (2-5)	2.5 (2-4)	0.348
Parity	1 (1-4)	1 (1-2)	0.652
Abortion	0 (0-2)	0 (0-2)	0.955
Previous birth to pregnancy interval (weeks)	56.5±22	40.8±19.5	0.001*
Gestational age at birth (days)	277.7±7.4	273.2±2.2	0.002
Body mass index (kg/m^2)	29.48±4.05	29.7±4.8	0.793
Bishop score	3 (1-7)	1.5 (1-2)	<0.001*
Female gender	16 (51.6%)	52 (54.7%)	0.461
Prelabor rupture of membranes	4 (9.7%)	1 (3.4%)	<0.001*
Birth weight (gr)	3505±429	3182±399	0.001*
1. min Apgar score	9 (5-9)	10 (8-10)	0.561
5. min Apgar score	10 (8-10)	10 (9-10)	0.863
Umbilical cord pH	7.27±0.8	7.27±0.12	0.946
Uterine dehiscence	1 (3.2 %)	1 (1.1%)	0.433
Maternal complication	0 (0%)	4 (4.3%)	0.510
Perinatal complication	1 (3.2%)	10 (10.5%)	0.291

Values are reported as mean±sd, median (min-max) or % and number
p<0.05, statistically significant difference.
TOLAC: Trial of labor after cesarean; ERCS: Elective repeat cesarean section.

onset of labor.[17] In our study, 64.5% of women who attempted labor had successful vaginal deliveries. In our opinion, this is related to the high rates of induction of labor in our series. Also, the rate of cases with previous vaginal delivery for our group was also lower.[15,22] In addition, in the present study, almost half of the patients had their previous CS for failure to progress. According to a practice bulletin from the American College of Obstetricians and Gynecologists in 2010, the success rate of TOLAC with failure to progress or CPD as prior CS indication was 54%.[23] These factors are most likely to acknowledge the success rate in this series.

Several studies have investigated the factors affecting the success of TOLAC. The most important factor positively associated with success is prior vaginal birth, which determines a threefold increase in the chance of achieving VBA.[16,24-26] According to a recent meta-analysis, previous vaginal birth, high Bishop scores, and fetal malpresentation as indications of previous CS are associated with a successful VBAC; the factors that reduce TOLAC success are advanced age, obesity, macrosomia, labor induction, and failure to progress as indications of previous

TABLE 2: Obstetric features of TOLAC patients.

Characteristics	Value
Previous CS indication	
Failure to progress	13 (41.9%)
Nonreassuring fetal testing	6 (19.3%)
Malpresentation	3 (9.6%)
Multiple pregnancy	3 (9.6%)
Fetal macrosomia	2 (6.4%)
Maternal request	2 (6.4%)
Other	2 (6.4%)
Previous vaginal delivery history	8 (25.8%)
Spontaneous labor	7 (22.5%)
Labor induction	
Foley catheter	5 (16.1%)
Oxytocin	4 (12.9%)
Foley catheter + Oxytocin	15 (48.3%)
Augmentation	20 (64.5%)
CS rate	11 (35.4%)
CS indication	
Failure to progress	5 (45.4%)
Nonreassuring fetal testing	2 (18.1%)
Amniotomy complication	2 (18.1%)
Uterine dehiscence	1 (9.09%)
Maternal request	1 (9.09%)

Values are reported as mean±sd, median (min-max) or % and number
p<0.05, statistically significant difference.
TOLAC: Trial of labor after cesarean.

TABLE 3: Comparison of successful and failed vaginal deliveries in terms of primary demographic, clinical characteristics and obstetric results.

Characteristics	Success of TOLAC (n=20)	Failure of TOLAC (n=11)	p
Age	30.6±4.6	32.4±6.1	0.367
Gravida	2 (2-5)	3(2-5)	0.555
Parity	1(1-4)	1(1-2)	0.792
Abortion	0(0-1)	0(0-2)	0.427
Previous birth to pregnancy interval (weeks)	53.85±14.8	61.36±31.8	0.375
Body mass index (kg/m^2)	28.7±.4.2	30.9±3.5	0.150
Estimated fetal weight (gr)	3446.5±414	3516.4±259	0.617
Bishop score	3.5(1-7)	1(1-4)	0.001*
Prelabor rupture of membranes	3(%15)	0(%0)	0.535
Spontaneous labor	6 (%30)	1 (%9.1)	0.372
Female gender	11(%68.8)	5(%31.3)	0.716
Birth weight (gr)	3393±395	3708±430	0.049*
Gestational age at birth (days)	278.3±7.6	276.6±7.2	0.556

Values are reported as mean±sd, median (min-max) or % and number
p<0.05, statistically significant difference.
TOLAC: Trial of labor after cesarean.

CS.[27] In a prospective study, Faucett et al. found a negative impact of obesity and macrosomia on VBAC success.[28] Landon et al. identified several factors that are independently associated with TOLAC success, namely, previous vaginal delivery, previous indication not being dystocia, spontaneous labor, and birth weight < 4000 g.[29] Lin et al. reported that the Bishop score and spontaneous labor are significant independent predictors of VBAC.[30] According to Kruit et al., women with spontaneous onset of labor are more likely to have successful VBAC deliveries.[31] Gobillot et al. investigated the distinction between favorable and unfavorable cervixes. They demonstrated that a Bishop score ≥ 6 has an odds ratio of 4.66 for successful VBAC deliveries.[32] The factors associated with successful TOLAC determined in the current work have also been found by other studies. In our study, the Bishop scores were significantly higher and the birth weights were significantly lower in the successful TOLAC group. The rate of spontaneous labor was 30% in the successful TOLAC group; this rate in the unsuccessful group was 9.1%, but their difference did not reach statistical significance.

Uterine rupture after planned VBAC is a well-known complication, but its incidence varies widely between studies. The interchangeable use of the terms "uterine rupture" and "uterine dehiscence" is an important factor for this difference.[33] The overall risk for uterine rupture in women who attempt VBAC delivery is 0.3–0.7%.[13,34] In a retrospective cohort study of over 600 women, Cahill et al. found uterine rupture frequencies of 0.4% for TOLAC and 0.16% for ERCS.[35] Rossi and D'Addari, who included both partial and complete ruptures in their study, found uterine injury incidences of 1.3% in the TOLAC group and 0.4% in the ERCS group. The risk of uterine injury is threefold in patients planning VBAC.[36] In our study, none of the cases experienced uterine rupture, althought one patient each in the TOLAC and ERCS groups experienced uterine dehiscence. A 2010 NIH report states that the risks of major and minor maternal complications except wound infection increase in the TOLAC group, but these complications do not differ significantly between the TOLAC and ERCS groups.[37] A systematic review reported similar overall risks of wound infection after planned VBAC and after ERCS.[38] In the present study, there were no short-term maternal complications noted in the TOLAC group; however, the ERCS group experienced three wound infections and one uterine atony. Guise et al. revealed 3.6% and 4.2% rates of transient tachypnea among newborns in its TOLAC and ERCS

groups, respectively; their Apgar score analysis showed no significant difference in the 5-minute Apgar scores of the groups.[39] A retrospective study conducted by Kamath et al. reported that 9.3% and 4.9% of infants born by ERCS and VBAC (p = 0.025), respectively, were admitted to the NICU.[40] According to our results, there were no significant differences in the neonatal outcomes between the groups. The risk of adverse perinatal outcomes for the women who attempted VBAC was lower but did not reach statistical significance. One of the babies (3.22%) delivered through planned VBAC was admitted to the NICU. This rate in the ERCS group was 10.52% (10/95). Nevertheless, the groups were similar in Apgar scores and umblical cord pH.

There are several cervical ripening methods for unfavorable cervix both mechanical and pharmacological. Prior studies showed that Foley catheter for scared uterus seems to be a safe option to improve vaginal delivery success without increasing maternal and fetal morbidity.[41,42] To the best of our knowledge, this is the first study conducted in Turkey which discussing the utility of Foley catheter in TOLAC patients.

One limitation of the present study is its retrospective design and inherent bias associated with retrospective studies. Additionaly, the sample size is small; therefore, we were unable to perform logistic regression analyses. Another limitation is that we evaluated only the short-term maternal and neonatal outcomes of patients; the long-term results of these patients were not investigated.

CONCLUSION

In conclusion, TOLAC is a farily safe procedure for selected pregnant women with one previous cesarean section. It should be offered to all suitable pregnant women in order to reduce high CS rate and prevent complication associated with higher order repeat cesarean. Foley induction is a good alternative for induction of labor in these cases and should be evaluated further with prospective studies conducted in our country.

Conflict of interest

The authors declare no conflict of interest for the present study.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Authorship Contributions

Idea/Concept: *Mehmet Serdar Kütük;* ***Design:*** *Taha Takmaz;* ***Control/Supervision:*** *Taha Takmaz, Mehmet Serdar Kütük;* ***Data Collection and/or Processing:*** *Hanifa Rana Dural, Irana Gorchiyeva;* ***Analysis and/or Interpretation:*** *Gökhan Kılıç, Rabia Zehra Bakar, Halime Cali Öztürk;* ***Literature Review:*** *Taha Takmaz;* ***Writing the Article:*** *Taha Takmaz, Mehmet Serdar Kütük;* ***Critical Review:*** *Mehmet Serdar Kütük.*

REFERENCES

1. World Health Organization Human Reproduction Programme, 10 April 2015. WHO Statement on caesarean section rates. Reprod Health Matters. 2015;23(45):149-50.[Crossref] [PubMed]
2. The Ministry of Health of Turkey. Turkey Demographic and Health Survey 2018. 2018. p.109.[Link]
3. Wingert A, Hartling L, Sebastianski M, Johnson C, Featherstone R, Vandermeer B, et al. Clinical interventions that influence vaginal birth after cesarean delivery rates: Systematic Review & Meta-Analysis. BMC Pregnancy Childbirth. 2019;19(1):529.[Crossref] [PubMed] [PMC]
4. American College of Obstetricians and Gynecologists' Committee on Practice Bulletins-Obstetrics. ACOG Practice Bulletin No. 205: Vaginal Birth After Cesarean Delivery. Obstet Gynecol. 2019;133(2):110-27.[Crossref] [PubMed]
5. Keag OE, Norman JE, Stock SJ. Long-term risks and benefits associated with cesarean delivery for mother, baby, and subsequent pregnancies: Systematic review and meta-analysis. PLoS Med. 2018;15(1):e1002494.[Crossref] [PubMed] [PMC]
6. Wymer KM, Shih YC, Plunkett BA. The cost-effectiveness of a trial of labor accrues with multiple subsequent vaginal deliveries. Am J Obstet Gynecol. 2014;211(1):56.e1-6.e12 [Crossref] [PubMed]
7. Xu X, Lee HC, Lin H, Lundsberg LS, Campbell KH, Lipkind HS, et al. Hospital variation in utilization and success of trial of labor after a prior cesarean. Am J Obstet Gynecol. 2019;220(1):98.e1-98.e14. [Crossref] [PubMed]
8. Devarajan S, Talaulikar VS, Arulkumaran S. Vaginal birth after caesarean. Obstetrics, Gynaecology & Reproductive Medicine. 2018;28(4):110-5.[Crossref]
9. Triebwasser JE, Kamdar NS, Langen ES, Moniz MH, Basu T, Syrjamaki J, et al. Hospital contribution to variation in rates of vaginal birth after cesarean. J Perinatol. 2019;39(7):904-10. [Crossref] [PubMed] [PMC]

10. Eyi EGY, Mollamahmutoglu L. An analysis of the high cesarean section rates in Turkey by Robson classification. J Matern Fetal Neonatal Med. 2019:1-11.[Crossref] [PubMed]
11. Tanos V, Toney ZA. Uterine scar rupture - Prediction, prevention, diagnosis, and management. Best Pract Res Clin Obstet Gynaecol. 2019;59:115-31.[Crossref] [PubMed]
12. Landon MB, Hauth JC, Leveno KJ, Spong CY, Leindecker S, Varner MW, et al; National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Maternal and perinatal outcomes associated with a trial of labor after prior cesarean delivery. N Engl J Med. 2004;351(25):2581-9.[Crossref] [PubMed]
13. Macones GA, Peipert J, Nelson DB, Odibo A, Stevens EJ, Stamilio DM, et al. Maternal complications with vaginal birth after cesarean delivery: a multicenter study. Am J Obstet Gynecol. 2005;193(5):1656-62.[Crossref] [PubMed]
14. Macones GA, Hausman N, Edelstein R, Stamilio DM, Marder SJ. Predicting outcomes of trials of labor in women attempting vaginal birth after cesarean delivery: a comparison of multivariate methods with neural networks. Am J Obstet Gynecol. 2001;184(3):409-13.[Crossref] [PubMed]
15. Gonen R, Tamir A, Degani S, Ohel G. Variables associated with successful vaginal birth after one cesarean section: a proposed vaginal birth after cesarean section score. Am J Perinatol. 2004;21(8):447-53.[Crossref] [PubMed]
16. Kalok A, Zabil SA, Jamil MA, Lim PS, Shafiee MN, Kampan N, et al. Antenatal scoring system in predicting the success of planned vaginal birth following one previous caesarean section. J Obstet Gynaecol. 2018;38(3):339-43.[Crossref] [PubMed]
17. Akçay T, Göl K, Şahin İ, Şimsek M. [The safety of vaginal birth after cesarean]. Turkiye Klinikleri J Gynecol Obst. 2001;11(4):224-7.[Link]
18. İngeç M, Kumtepe Y, Özdiller O, Coşgun S, Kadanalı S. [Vaginal birth after cesarean section]. T Klin Jinekol Obst. 2004;14(2):96-100 [Link]
19. Senturk MB, Cakmak Y, Atac H, Budak MS. Factors associated with successful vaginal birth after cesarean section and outcomes in rural area of Anatolia. Int J Womens Health. 2015;7:693-7.[Crossref] [PubMed] [PMC]
20. Ozek MO, Ozek A, Guler AE, Pehlivan H. Vaginal birth after cesarean (vbac) success and complication ratios in our clinic. J Turk Ger Gynecol Assoc. 2016;17:307.[Link]
21. Izbudak Uzun GP. Sezaryen sonrası vajinal doğum ile sezaryen doğumun maternal ve neonatal sonuçlarının karşılaştırılması. Zeynep Kamil Education and Research Hospital, Istanbul. 2018 Tez No: 497015.[Link]
22. Sims EJ, Newman RB, Hulsey TC. Vaginal birth after cesarean: to induce or not to induce. Am J Obstet Gynecol. 2001;184(6):1122-4.[Crossref] [PubMed]
23. American College of Obstetricians and Gynecologists. ACOG Practice bulletin no. 115: Vaginal birth after previous cesarean delivery. Obstet Gynecol. 2010;116(2 Pt 1):450-63.[Crossref] [PubMed]
24. Thapsamuthdechakorn A, Sekararithi R, Tongsong T. Factors Associated with Successful Trial of Labor after Cesarean Section: A Retrospective Cohort Study. J Pregnancy. 2018;2018:6140982. [Crossref] [PubMed] [PMC]
25. Li YX, Bai Z, Long DJ, Wang HB, Wu YF, Reilly KH, et al. Predicting the success of vaginal birth after caesarean delivery: a retrospective cohort study in China. BMJ Open. 2019;9(5): e027807.[Crossref] [PubMed] [PMC]
26. Mardy AH, Ananth CV, Grobman WA, Gyamfi-Bannerman C. A prediction model of vaginal birth after cesarean in the preterm period. Am J Obstet Gynecol. 2016;215(4):513.e1-7.[Crossref] [PubMed]
27. Wu Y, Kataria Y, Wang Z, Ming WK, Ellervik C. Factors associated with successful vaginal birth after a cesarean section: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2019;19(1):360.[Crossref] [PubMed] [PMC]
28. Faucett AM, Allshouse AA, Donnelly M, Metz TD. Do Obese Women Receive the Necessary Interventions to Achieve Vaginal Birth after Cesarean? Am J Perinatol. 2016;33(10):991-7.[Crossref] [PubMed]
29. Landon MB, Grobman WA; Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. What We Have Learned About Trial of Labor After Cesarean Delivery from the Maternal-Fetal Medicine Units Cesarean Registry. Semin Perinatol. 2016;40(5):281-6.[Crossref] [PubMed] [PMC]
30. Lin J, Hou Y, Ke Y, Zeng W, Gu W. Establishment and validation of a prediction model for vaginal delivery after cesarean and its pregnancy outcomes-Based on a prospective study. Eur J Obstet Gynecol Reprod Biol. 2019; 242:114-21.[Crossref] [PubMed]
31. Kruit H, Wilkman H, Tekay A, Rahkonen L. Induction of labor by Foley catheter compared with spontaneous onset of labor after previous cesarean section: a cohort study. J Perinatol. 2017;37(7):787-92.[Crossref] [PubMed]
32. Gobillot S, Ghenassia A, Coston AL, Gillois P, Equy V, Michy T, et al. Obstetric outcomes associated with induction of labour after caesarean section. J Gynecol Obstet Hum Reprod. 2018;47(10):539-43.[Crossref] [PubMed]
33. Guise JM, McDonagh MS, Osterweil P, Nygren P, Chan BK, Helfand M. Systematic review of the incidence and consequences of uterine rupture in women with previous caesarean section. BMJ. 2004;329(7456):19-25. [Crossref] [PubMed] [PMC]
34. Chauhan SP, Martin JN Jr, Henrichs CE, Morrison JC, Magann EF. Maternal and perinatal complications with uterine rupture in 142,075 patients who attempted vaginal birth after cesarean delivery: A review of the literature. Am J Obstet Gynecol. 2003;189(2):408-17.[Crossref] [PubMed]
35. Cahill AG, Stamilio DM, Odibo AO, Peipert JF, Ratcliffe SJ, Stevens EJ, et al. Is vaginal birth after cesarean (VBAC) or elective repeat cesarean safer in women with a prior vaginal delivery? Am J Obstet Gynecol. 2006;195(4): 1143-7. [Crossref] [PubMed]
36. Rossi AC, D'Addario V. Maternal morbidity following a trial of labor after cesarean section vs elective repeat cesarean delivery: a systematic review with metaanalysis. Am J Obstet Gynecol. 2008;199(3):224-31.[Crossref] [PubMed]
37. Cunningham FG, Bangdiwala SI, Brown SS, Dean TM, Frederiksen M, Rowland Hogue CJ, et al. NIH consensus development conference draft statement on vaginal birth after cesarean: new insights. NIH Consens State Sci Statements. 2010;27(3):1-42.[PubMed]
38. Guise JM, Eden K, Emeis C, Denman MA, Marshall N, Fu RR, et al. Vaginal birth after cesarean: new insights. Evid Rep Technol Assess (Full Rep). 2010;(191):1-397.[PubMed] [PMC]
39. Guise JM, Denman MA, Emeis C, Marshall N, Walker M, Fu R, et al. Vaginal birth after cesarean: new insights on maternal and neonatal outcomes. Obstet Gynecol. 2010;115(6):1267-78.[Crossref] [PubMed]
40. Kamath BD, Todd JK, Glazner JE, Lezotte D, Lynch AM. Neonatal outcomes after elective cesarean delivery. Obstet Gynecol. 2009;113(6): 1231-8. [Crossref] [PubMed] [PMC]
41. Rossard L, Arlicot C, Blasco H, Potin J, Denis C, Mercier D, et al. Maturation cervicale par sonde à ballonnet sur utérus cicatriciel: étude rétrospective sur trois ans [Cervical ripening with balloon catheter for scared uterus: a three-year retrospective study]. J Gynecol Obstet Biol Reprod (Paris). 2013;42(5):480-7.[Crossref] [PubMed]
42. Jozwiak M, van de Lest HA, Burger NB, Dijksterhuis MG, De Leeuw JW. Cervical ripening with Foley catheter for induction of labor after cesarean section: a cohort study. Acta Obstet Gynecol Scand. 2014;93(3):296-301.[Crossref] [PubMed]